UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/916,629	08/22/1997	CHAD A. COBBLEY	97-0098	3496

7590 09/24/2003

33

STEPHEN A GRATTON
2764 SOUTH BRAUN WAY
LAKEWOOD, CO 80228

EXAMINER
AFTERGUT, JEFF H

ART UNIT	PAPER NUMBER
1733	

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	08/916,629	COBBLEY ET AL.	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22 and 40-44* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22 and 40-44* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-20 and 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krall in view of Chorbadjiev et al, the admitted prior art, either one of Loctite 410 or Loctite 416 for the same reasons as expressed in paper no. 31, paragraph 2 further taken with the state of the prior art as exemplified by at least one of Liang et al (newly cited), Fogal et al (newly cited), Farnworth (newly cited), Davis (newly cited), and German Patent 4107347 (newly cited).

The references as set forth in paragraph 31 and in particular Krall suggested that cyanoacrylate adhesive would have been useful for joining a chip to a lead in the manufacture of a semiconductor package. The reference did not expressly state that the chip was assembled to the leadframe but rather referred to the chip being attached to the leads with adhesive. It should be noted that the reference clearly did not refer to "wire bonding" as addressed by applicant in the response. The reference was silent as to what was meant by chip to lead attachment. The applicant is advised that one skilled in the art would have been expected to have basic knowledge of the art and one skilled in the art would have been expected to use common sense and common knowledge from the art, In re Bozek, 163 USPQ 545. The ordinary artisan is presumed to know more than what he reads in the references, he is presumed to have sufficient basic knowledge to apply and combine features of the prior art, In re Sovish, 226 USPQ 771, In re Bode, 191 USPQ 12.

The references to any one of Liang et al, Fogal et al, Farnworth, Davis, and German Patent 4107347 all suggested that one skilled in the art would have known that "wire bonding"

was associating a wire between the chip and the leads and that the wire bonding operation did not include the use of adhesive to join the wire to the chip and the lead. Applicant is referred to the drawings of each document. Additionally, each reference suggested that one skilled in the art would have incorporated an adhesive like an epoxy between the chip and/or die and the leadframe at the paddle of the leadframe. In each of these references, this is where the chip and the lead frame interface is taught and where the same is joined with adhesive. The applicant is also referred to the admitted prior art of **this application**, where the applicant admitted that it was known to join a chip to a leadframe with epoxy adhesive for example, see pages 2-3 of the specification and note that the admitted prior art also suggested that "wire bonding" was in fact a separate and distinct operation from the adhesive bonding operation. Clearly, one viewing the state of the prior art as exemplified by at least one of Liang et al, Fogal et al, Farnworth, Davis, and German Patent 4107347. Certainly, then, when one skilled in the art viewed Krall, one skilled in the art would have understood that the operation where adhesive was used would have included the joining of the chip to the paddle of the leadframe (since this is the place where the chip is associated with adhesive in the operation of associating a chip to a lead) with the cyanoacrylate adhesive.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a cyanoacrylate adhesive to join leads of a leadframe to a semiconductor chip as such was suggested by Krall wherein the cyanoacrylate adhesive would have been known to have incorporated an electrically conductive filler therein in order to facilitate electrical conductivity whereby such an adhesive had a quick cure time as evidenced by Chorbadjiev et al and wherein the adhesive was known to have had a cure time within less than one minute at

room temperature as suggested by the applicant's admitted prior art and either one of Loctite 410 or Loctite 416 as the references to at least one of Liang et al, Fogal et al, Farnworth , Davis , and German Patent 4107347 suggested that one skilled in the art viewing the teachings of Krall would have applied the adhesive to join the chip to the leadframe.

Applicant is referred to paper no. 31 for a complete discussion of the dependent claims.

3. Claims 21, 22, 40, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art in view of Japanese Patent 58-196,280 for the same reasons as suggested in paper no. 31, paragraph 3.

The admitted prior art suggested that it was known to join a chip to a leadframe with an epoxy adhesive material, see pages 2 and 3 of the specification. The applicant also admitted that anaerobic and cyanoacrylate adhesives were known in the prior art and had been formulated to cure in less than 60 seconds but that the same were not known to have been used to construct a semiconductor package.

The reference to Japanese Patent '280 suggested that it was known to utilize an anaerobic adhesive to join a chip to leads of a board in the manufacture of a semiconductor assembly wherein the anaerobic adhesive material was an acrylic anaerobic adhesive material. The reference failed to make mention of the specific cure times of the anaerobic adhesive material, however it did suggest that the cure times would have been fast. Additionally, the abstract suggested that the adhesive would have included filler therein in order to render the adhesive material electrically conductive. It would have been obvious to employ the quick curing adhesives of Japanese Patent '280 in the operation of joining a chip to a leadframe as such use of anaerobic adhesives would have sped up productivity.

Response to Arguments

4. Applicant's arguments with respect to claims 1-22 and 40-44 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that neither reference to Krall or Japanese Patent '280 related to the attachment of a chip to a leadframe and that the reference to Krall was non-analogous art. The applicant is advised that one skilled in the art at the time the invention was made would have readily ascertained where adhesive was used to associate a chip and/or die to a leadframe and that such was provided for in the paddle region of a leadframe as evidenced by any one of Liang et al, Fogal et al, Farnworth, Davis, and German Patent 4107347 as well as the admitted prior art suggested that it was well known in the art to join a chip upon a leadframe with adhesive there between. Additionally quick curing adhesives like cyanoacrylate and anaerobic adhesives were known per se in the art, however the applicant took the position that these materials were not known to have been used in semiconductor package manufacture. The references to Krall and Japanese Patent '280 expressly suggested that those skilled in the art of semiconductor packages were well aware of the use of cyanoacrylate and anaerobic adhesives in the art of semiconductor chip packaging. The ordinary artisan is presumed to know more than what he reads in the references themselves and is presumed to have basic knowledge of how to apply and combine features of the prior art.

Regarding whether Krall is analogous prior art, the reference clearly expressed that a chip was bonded to a lead with methyl cyanoacrylate adhesive as such would afford one with the advantage of inspecting the joint after formation. Clearly such was expressly suggested by the reference. The fact that the reference utilized the cyanoacrylate adhesive for a different purpose

in the invention of Krall is immaterial to the teachings suggested by Krall to the ordinary artisan in the art of semiconductor manufacture.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael W. Ball can be reached on 703-308-2058. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
September 10, 2003